

**ABSTRACT**

An electrically-pumped terahertz (THz) frequency radiation source (or detector), including an optical gain (or absorption) material with two electrodes electrically coupled to the optical gain material. The optical gain (or absorption) material is formed substantially of at least one group IV element and doped with at least one dopant, which has an intra-center transition frequency in a range of about 0.3THz to 30THz. Also, a method of manufacturing electrically-pumped THz frequency radiation sources (or detectors).